Assembly codes
Level 2
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TITLE: An AL Program to display a character.

```
 .MODEL SMALL
 .STACK 100H

 .CODE
   MAIN PROC
     MOV AH, 2                    ; display the character '@'.
     MOV DL, "@"
     INT 21H

     MOV AH, 4CH                     ; return control to DOS
     INT 21H
   MAIN ENDP
 END MAIN
```

TITLE: Program to read a character and display it on a new
             ; line.

```
 .MODEL SMALL
 .STACK 100H

 .CODE
   MAIN PROC
     MOV AH, 1                    ; read a character
     INT 21H

     MOV BL, AL                    ; save input character into BL

     MOV AH, 2                    ; carriage return
     MOV DL, 0DH
     INT 21H

     MOV DL, 0AH                    ; line feed
     INT 21H

     MOV AH, 2                    ; display the character stored in BL
     MOV DL, BL
     INT 21H

     MOV AH, 4CH                     ; return control to DOS
     INT 21H

   MAIN ENDP
 END MAIN
```

TITLE: An AL Program to display a string.

```
 .MODEL SMALL
 .STACK 100H

 .DATA
    STRING_1  DB  'Assolam-o-Allikum$'
    STRING_2  DB  'Pakistan Zindabad$'

 .CODE
   MAIN PROC
     MOV AX, @DATA                ; initialize DS
     MOV DS, AX

     LEA DX, STRING_1             ; load & display the STRING_1
     MOV AH, 9
     INT 21H

     MOV AH, 2                  ; carriage return
     MOV DL, 0DH
     INT 21H

     MOV DL, 0AH                 ; line feed
     INT 21H

     LEA DX, STRING_2             ; load & display the STRING_2
     MOV AH, 9
     INT 21H

     MOV AH, 4CH                 ; return control to DOS
     INT 21H
   MAIN ENDP
 END MAIN
```

TITLE: An AL Program to read two digits whose sum is less than 0,
; computes and display their sum (without using variables).

```
 .MODEL SMALL
 .STACK 100H

 .DATA
    PROMPT_1  DB  'Enter the First digit : $'
    PROMPT_2  DB  'Enter the Second digit : $'
```

```
    PROMPT_3  DB  'Sum of First and Second digit : $'



 .CODE
   MAIN PROC
     MOV AX, @DATA               ; initialize DS
     MOV DS, AX

     LEA DX, PROMPT_1            ; load and display the PROMPT_1
     MOV AH, 9
     INT 21H

     MOV AH, 1                   ; read a character\digit
     INT 21H

     MOV BL, AL                  ; save First digit in BL in ASCII code
     SUB BL, 30H

     MOV AH, 2                   ; carriage return
     MOV DL, 0DH
     INT 21H

     MOV DL, 0AH                 ; line feed
     INT 21H

     LEA DX, PROMPT_2            ; load and display the PROMPT_2
     MOV AH, 9
     INT 21H

     MOV AH, 1                   ; read a character
     INT 21H

     MOV BH, AL                  ; save Second digit in BH in ASCII
CODE
     SUB BH, 30H

     MOV AH, 2                   ; carriage return
     MOV DL, 0DH
     INT 21H

     MOV DL, 0AH                 ; line feed
     INT 21H

     LEA DX, PROMPT_3            ; load and display the PROMPT_3
     MOV AH, 9
     INT 21H
```

```
    ADD BL, BH                ; add First and Second digit
    ADD BL, 30H               ; convert ASCII to DECIMAL code

    MOV AH, 2                 ; display the character


  MOV DL, BL
    INT 21H

    MOV AH, 4CH               ; return control to DOS
    INT 21H
   MAIN ENDP
 END MAIN
```

```
TITLE AL-005 : An AL Program to read two digits such that second digit is
              ; less than the first digit, computes and display their
              ; difference ( without using variables ).

 .MODEL SMALL
 .STACK 100H

 .DATA
    PROMPT_1  DB  'Enter the First digit : $'
    PROMPT_2  DB  'Enter the Second digit : $'
    PROMPT_3  DB  'Difference of First and Second digit : $'

 .CODE
   MAIN PROC
     MOV AX, @DATA            ; initialize DS
     MOV DS, AX

     LEA DX, PROMPT_1         ; load and display the PROMPT_1
     MOV AH, 9
     INT 21H

     MOV AH, 1                ; read a character
     INT 21H

     MOV BL, AL               ; save First digit in BL in ASCII code
     SUB BL, 30H

     MOV AH, 2                ; carriage return
     MOV DL, 0DH
     INT 21H
```

```
    MOV DL, 0AH                ; line feed
    INT 21H

    LEA DX, PROMPT_2             ; load and display the PROMPT_2
    MOV AH, 9
    INT 21H

    MOV AH, 1                  ; read a character
    INT 21H


   MOV BH, AL                  ; save Second digit in BH in ASCII Code.
    SUB BH, 30H

    MOV AH, 2                  ; carriage return
    MOV DL, 0DH
    INT 21H

    MOV DL, 0AH                ; line feed
    INT 21H

    LEA DX, PROMPT_3             ; load and display the PROMPT_3
    MOV AH, 9
    INT 21H

    SUB BL, BH                 ; subtract First and Second digit

    ADD BL, 30H                 ; convert ASCII to DECIMAL code

    MOV AH, 2                  ; display the character\digit
    MOV DL, BL
    INT 21H

    MOV AH, 4CH                 ; return control to DOS
    INT 21H
  MAIN ENDP
 END MAIN
```

```
TITLE: An AL Program to read two digits whose sum is less than 0,
             ; computes and display their sum (using variables).

 .MODEL SMALL
 .STACK 100H

 .DATA
```

```
   PROMPT_1  DB  'Enter the First digit : $'
   PROMPT_2  DB  'Enter the Second digit : $'
   PROMPT_3  DB  'Sum of First and Second digit : $'

   VALUE_1   DB  ?
   VALUE_2   DB  ?

 .CODE
   MAIN PROC
    MOV AX, @DATA               ; initialize DS


   MOV DS, AX

    LEA DX, PROMPT_1            ; load and display the PROMPT_1
    MOV AH, 9
    INT 21H

    MOV AH, 1                  ; read a character
    INT 21H

    SUB AL, 30H                 ; save First digit in VALUE_1 in ASCII
code
    MOV VALUE_1,AL

    MOV AH, 2                  ; carriage return
    MOV DL, 0DH
    INT 21H

    MOV DL, 0AH                 ; line feed
    INT 21H

    LEA DX, PROMPT_2            ; load and display the PROMPT_2
    MOV AH, 9
    INT 21H

    MOV AH, 1                  ; read a character
    INT 21H

    SUB AL, 30H                 ; save Second digit in VALUE_2 in
ASCII code
    MOV VALUE_2,AL

    MOV AH, 2                  ; carriage return
    MOV DL, 0DH
    INT 21H

    MOV DL, 0AH                 ; line feed
```

```
    INT 21H

    LEA DX, PROMPT_3            ; load and display the PROMPT_3
    MOV AH, 9
    INT 21H

    MOV AL, VALUE_1             ; add First and Second digit
    ADD AL, VALUE_2

    ADD AL, 30H                 ; convert ASCII to DECIMAL code

    MOV AH, 2                   ; display the character
    MOV DL, AL


   INT 21H

    MOV AH, 4CH                 ; return control to DOS
    INT 21H
  MAIN ENDP
 END MAIN
```

TITLE AL-07 : An AL Program to read two digits such that second digit is
; less than the first digit, computes and display their
; difference (using Variables).

```
 .MODEL SMALL
 .STACK 100H

 .DATA
    PROMPT_1  DB  'Enter the First digit : $'
    PROMPT_2  DB  'Enter the Second digit : $'
    PROMPT_3  DB  'Sum of First and Second digit : $'

    VALUE_1   DB  ?
    VALUE_2   DB  ?

 .CODE
   MAIN PROC
     MOV AX, @DATA               ; initialize DS
     MOV DS, AX

     LEA DX, PROMPT_1            ; load and display the PROMPT_1
     MOV AH, 9
     INT 21H

     MOV AH, 1                   ; read a character
     INT 21H

     SUB AL, 30H                 ; save First digit in VALUE_1 in ASCII
code
     MOV VALUE_1,AL

     MOV AH, 2                   ; carriage return
     MOV DL, 0DH
     INT 21H

     MOV DL, 0AH                 ; line feed
     INT 21H

     LEA DX, PROMPT_2            ; load and display the PROMPT_2
     MOV AH, 9
     INT 21H

     MOV AH, 1                   ; read a character
     INT 21H
```

```
    SUB AL, 30H                ; save Second digit in VALUE_2 in
ASCII code
    MOV VALUE_2,AL

    MOV AH, 2                  ; carriage return
    MOV DL, 0DH
    INT 21H

    MOV DL, 0AH                ; line feed
    INT 21H

    LEA DX, PROMPT_3           ; load and display the PROMPT_3
    MOV AH, 9
    INT 21H

    MOV AL, VALUE_1            ; Subtract First and Second digit
    SUB AL, VALUE_2

    ADD AL, 30H                ; convert ASCII to DECIMAL code

    MOV AH, 2                  ; display the character
    MOV DL, AL
    INT 21H

    MOV AH, 4CH                ; return control to DOS
    INT 21H
  MAIN ENDP
 END MAIN
```

```
TITLE AL-008 : An AL Program to read a letter in lower case and
print it
           ; after converting it in to Upper case.

 .MODEL SMALL
 .STACK 100H

 .DATA
   PROMPT_1  DB  'Enter the Lower Case Letter : $'
   PROMPT_2  DB  'The Upper Case Letter is : $'

 .CODE
  MAIN PROC
    MOV AX, @DATA              ; initialize DS
    MOV DS, AX

    LEA DX, PROMPT_1           ; load and print PROMPT_1
    MOV AH, 9
```

```
    INT 21H

    MOV AH, 1                  ; read a letter
    INT 21H

    MOV BL, AL                  ; save the letter in BL

    MOV AH, 2                  ; return carriage
    MOV DL, 0DH
    INT 21H

    MOV DL, 0AH                  ; line feed
    INT 21H

    LEA DX, PROMPT_2             ; load and print PROMPT_2
    MOV AH, 9
    INT 21H

    SUB BL, 20H                 ; convert a lower case letter to upper
case letter

    MOV AH, 2                  ; print the Upper case letter
    MOV DL, BL
    INT 21H

    MOV AH, 4CH                 ; return control to DOS
    INT 21H
  MAIN ENDP
 END MAIN
```

```
TITLE AL-009 : An AL Program to read a character and display it
on new line
             ; with user prompts initialized by constants.

 .MODEL SMALL
 .STACK 100H

 .DATA
   MSG_1  EQU  'Enter the character : $'
   MSG_2  EQU  0DH,0AH,'The given character is : $'

   PROMPT_1  DB  MSG_1
   PROMPT_2  DB  MSG_2

 .CODE
  MAIN PROC
    MOV AX, @DATA               ; initialize DS
```

```
    MOV DS, AX

    LEA DX, PROMPT_1            ; load and display PROMPT_1
    MOV AH, 9
    INT 21H

    MOV AH, 1                   ; read a character
    INT 21H

    MOV BL, AL                  ; save the given character into BL

    LEA DX, PROMPT_2            ; load and display PROMPT_2
    MOV AH, 9
    INT 21H

    MOV AH, 2                   ; display the character
    MOV DL, BL
    INT 21H


    MOV AH, 4CH                 ; return control to DOS
    INT 21H
  MAIN ENDP
END MAIN
```